REMARKS

The outstanding Office Action addresses and rejects claims 6-10. Applicants respectfully request reconsideration of the present application in view of the remarks below.

Claim Rejections

The Examiner rejects claims 6-10 pursuant to 35 U.S.C. § 102(e), or in the alternative pursuant to 35 U.S.C. §103(a), alleging that the claims are either anticipated by or obvious in view of U.S. Patent 6,269,957 to Bowers et al. ("Bowers"). In particular, the Examiner argues that Bowers discloses an ultrafiltration vessel comprising a vessel having an interior wall with an outlet port, an ultrafiltration membrane covering the port, and the membrane having a skin-to-skin seal effective to cover a full area of the vessel wall.

Applicants traverse this rejection and submit that the pending claims distinguish over the Bowers reference.

The Claims

The claimed invention is directed to an ultrafiltration vessel with an ultrafiltration membrane covering the outlet port. The membrane includes a *skin-to-skin crush seal* that allows the ultrafiltration membrane to cover a *full wetted area* of the vessel interior wall. Applicants have found that using a skin-to-skin crush seal provides several advantages over the prior art, including permitting 100% of the wetted area of the vessel interior to be formed from active membrane. The resulting filter can achieve maximum filtration, leading to maximum concentration rate and protein recovery.

The Bowers Reference

The Bowers reference generally relates to an ultrafiltration vessel, but fails to teach or suggest an ultrafiltration membrane having the required skin-to-skin crush seal. In one embodiment, the Bowers reference discloses a separation vessel with a conical region extending to a closed tip and a port in the wall of the conical region. A filter sheet, such as a wedge-shaped filter sheet, can be positioned within the cone area of the vessel to cover the port. (See FIGS. 1-

9.) The filter sheet preferably has a polymeric backing and the Bowers reference discloses welding or fastening the filter to the wall of the vessel by a process such as heat fusing or solvent welding.

In particular, the Bowers reference discloses a heat bonding procedure that preferably includes the insertion of a shaped heating tool to melt the vessel wall and create a bond with the filter material. In particular, FIG. 13D and col. 15 lines 33-65 describe a stepwise compression of the membrane during heating so as to first allow steam to escape prior to melting of the thermoplastic, followed by forcing of the molten plastic from the tube wall into the backing of the filter material.

In another embodiment, Bowers discloses a clamshell filter assembly. Filter material is placed on a sheet of polymeric material having a number of troughs, where each trough represents one half of a vessel wall. (See FIGS. 10A-10D.) The filter material is then preferably pressed into the troughs and bonded to the polymeric sheet to create a vessel half. A second vessel half is then mated to the first vessel half in a second bonding step. Mating of the first and second vessel halves is discussed at Column 3, lines 11-15 which states, "[a] second symmetrically shaped filter bearing polymer sheet is then laid on top to complete each of the vessel chambers, and the two *polymer sheets* are bonded together, for example by heat fusion, solvent or ultrasonic welding, or the like, to form a strip of n vessels." (Emphasis added.)

In order to form the polymer/polymer bond between the polymer vessel halves, the filter material/vessel interface created in the first bonding step is preferably treated or cut away at point "e." (FIG. 10C.) By removing the excess material, and in particular the regenerated cellulose filter material at point "e", a polymer/polymer seal is created between the polymer sheets.

The Rejection

The Examiner argues that the Applicants' claimed invention is anticipated by Bowers, however, Bowers fails to disclose an ultrafiltration membrane having a skin-to-skin crush seal or an ultrafiltration membrane which is active over the full wetted area of the interior vessel wall.

In addition, Bowers provides no motivation to substitute the claimed elements missing from its disclosure.

In particular, the Examiner focuses on the Bowers clamshell embodiment as anticipating the claims of the present invention. In this embodiment, a bond is created between the non-cellulosic polymer backing of the regenerated cellulose filter material and the thermoplastic vessel, as well as between two thermoplastic halves of the vessel. Neither of these bonds is a skin-to-skin bond of the ultrafiltration membrane as required by the Applicants' claims. Thus, Bowers fails to anticipate the claimed invention.

The Examiner argues the filtration vessel taught in Bowers results in a crush seal which is the same as the skin-to-skin seal in the claimed invention because the joint (bond), being embedded in the wall, is not visible to the inside of the vessel. Applicants respectfully disagree.

The joint in Bowers results in inactive space in the filter vessel wall. The bond between the regenerated cellulose filter material and vessel at 54 in FIG. 10C of Bowers includes polymeric material from the vessel wall which has been melted and forced into the porous backing of the filter material. The resulting regenerated cellulose/thermoplastic interface can no longer work as a filter and is thus an area of inactive filter surface. In addition, any regenerated cellulose remaining in this area is cut away to form the polymer/polymer seal between vessel halves.[1] This polymer/polymer seal similarly results in inactive filter surface area. Conversely, in the present application, regenerated cellulose is pressed against a regenerated cellulose surface to form a skin-to-skin crush seal which does not destroy any of the filter area. As a result, the ultrafiltration membrane is active over the full wetted area of the interior wall.

The Bowers reference also fails as a basis to render obvious claims 7-10. The Bowers reference provides a workable solution for ultrafiltration. One of ordinary skill in the art would not be motivated by anything in Bowers to substitute the polymer/regenerated cellulose polymer backing and polymer/polymer bond found in the Bowers reference, for a skin-to-skin seal as required by the present claims. Such a substitution would require substituting not only the

[1] Regenerated cellulose membrane in this area must be cut away to permit a polymer/polymer seal between chambers since the regenerated cellulose itself is not a thermoplastic and molten polymer will not stick to it.

bonding structure of Bowers, but also the materials used to form the bond. The only motivation for making such a dramatic substitution would require reliance on impermissible hindsight gleamed from the Applicants' own specification. Thus, the obviousness rejection of claim 7-10 based on Bowers is improper and should be withdrawn.

Independent Claim 6

The claim rejections of the pending Office Action also include a rejection of claim 6 pursuant to 35 U.S.C. 102(e) that states, "Bowers teaches an ultrafiltration vessel comprising a vessel having an interior wall having a regenerated cellulose surface, with an outlet port and ultrafiltration membrane covering the port." Applicant respectfully disagrees.

The portions of Bowers cited in support of the this rejection disclose a *polymeric vessel* with a regenerated cellulose membrane covering the interior vessel wall. Conversely, claim 6 requires an interior *vessel wall* having a regenerated cellulose surface (i.e., at least the interior wall of the vessel comprises regenerated cellulose).

The only materials disclosed in the Bowers reference for the vessel are polypropylene or similar thermoplastics. Moreover, the methods for constructing the apparatus of Bowers would not work for the device of claim 6 because Bowers bonding methods are designed for mating a *thermoplastic* vessel with a thermoplastic support backing of a regenerated cellulose membrane. The regenerated cellulose used for the vessel wall in claim 6 is not a thermoplastic and sticking anything to it is difficult. If one attempted to use the welding or heat sealing described in Bowers to create a filter device with a vessel having a regenerated cellulose surface, the device would fail because no seal could be made between the polymeric backing of the ultrafiltration membrane and regenerated cellulose vessel wall. Accordingly, Bowers can not anticipate independent claim 6.

Conclusion

Applicants therefore believe that claims 6 and 7 are patentably distinct from the prior art, and dependent claims 8-10 are allowable at least because they depend from allowable base claims. Allowance is therefore respectfully requested.

The Examiner is urged to telephone the undersigned Attorney for Applicants in the event that such communication is deemed to expedite allowance of this application.

Respectfully submitted,

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